Air Power: Promise and Reality. Edited by Mark K. Wells. Chicago: Imprint Publications, 2000. xv + 339 pp. $39.95, paper.

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Air Power: Promise and Reality is a must-read for all air power enthusiasts. It's an excellent reference for those considering air power's purpose, relevance, and ability to support national security objectives. It provides a concise history through a series of essays covering the evolution of air power from 1903 through the Gulf War in 1991. By highlighting the vital and dynamic links between technology, doctrine, organization, leadership, and vision, *Air Power: Promise and Reality* describes air power's maturation as a significant element of the United States' unmatched warfighting capability.

The book consists of 15 essays in four sections, covering the evolution of air power, its role in World War II, the changes which drove strategic focus in the US Air Force, and air power's role during and after the Cold War. All provide useful insights, but two essays stand out for their treatment of the implications of leadership, technology, and doctrine on air power's evolution.

Horst Boog's essay, "Higher Command and Leadership in the Luftwaffe, 1935-1945," discusses leadership defects in the Luftwaffe during World War II. These significant flaws prevented the Luftwaffe from serving as the decisive arm of the German armed forces. Looking at three areas of concern, Boog shows that a narrow focus on operations and tactics on the part of senior Luftwaffe commanders led to disastrous results for German forces.

Boog first looks at the area of leadership training. Although senior leadership desired universally educated, independent thinkers for general staff officers, changes in the German Air War Academy curriculum negated this. Required courses in topics such as armament, economics, industrial operations, and mechanics were all deleted (111). Military history was "taught only to illustrate operational and tactical problems. It did not examine the interdependence among politics, economics, and warfare at the level of grand strategy" (111-112).

Support functions also suffered as a result of blinkered thinking by Luftwaffe leadership. According to Boog, such functions as logistics, training, intelligence, and technology were nearly excluded from command consideration (114). In fact, General Jeschonnek, Chief of the Luftwaffe General Staff, built a staff focused on elements he felt were essential to operations while "jettison[ing] as 'ballast' and unnecessary for the immediate purposes of air operations the training, signal communications, and medical inspectorates as well as the civilian air defense staff" (119). The result, Boog implies, was a decrease in staff expertise in these functions.

Finally, the hierarchy gave far too much weight to tactics at the expense of technologies. This affected potential Luftwaffe war-fighting capabilities. Two elements contributed to this weakness. First, senior staff felt engineers should provide the required expertise necessary for emerging technologies and thus allow the staff to focus on operations. However, as engineers were relatively unimportant in the Luftwaffe, their knowledge could not make a significant impact (125). Secondly, the reduced technical training of general staff officers left them unprepared to deal with technological changes (115).

Throughout this essay Boog suggests leadership, although not an exact science, is key to an organization's success. Moreover, whether leadership creates the vision to serve as technological roadmap or simply provides subordinates with the knowledge necessary to organize, train, equip and fight, that leadership must focus its energies broadly enough to develop and guide the entire military force. A narrow leadership perspective, as Boog shows, impairs war-fighting capability.

A second important essay in the collection is Robert Perry's "The Interaction of Technology and Doctrine in the U.S. Air Force." It outlines the complex relationship between technology and doctrine in the Air Force, focusing on three core ideas. The first is that useful military weapons most often result from already proven technologies. Second, the development of Air Force doctrine since World War II has been greatly influenced by assumptions about the rate and direction of new weapon technologies. Finally, problems with both technology and the development of doctrine occur because Air Force leaders do not understand the consequences of basing doctrine on unproven technologies (205).

To support his core ideas, Perry chronicles the intercontinental ballistic missile (ICBM) development program. Beginning in 1948, Air Force planners assumed bombers would dominate the strategic (or nuclear) force structure, followed eventually by intercontinental cruise missiles, and lastly by ICBMs (209). However, senior decision-makers also believed ICBM development would evolve from the cruise missile. Initial efforts focused primarily on developing the cruise missile, though Air Force leadership did not understand most technology required for ICBMs was currently available and that cruise missile development was much more complex than originally envisioned (210).

By 1953, the Department of Defense believed it could develop ICBMs within a four- to five-year period instead of the fifteen years initially assessed. Because cruise missiles were thought to be the future, the Air Force did not initiate a ballistic missile program until 1955, fearing ICBM funds would decrease the share of funding for the cruise missile, the weapon of choice (212). This delay was significant as ICBMs became, by 1963, the "nation's chief instruments of strategic warfare,

entrenched so securely in both doctrine and force structure that proposals for alternatives or supplemental strategic weapons encountered impressive objections" (213). Although technology supports this decision, doctrinal squabbles caused turmoil within Air Force leadership. Perry says of the decision to build ICBMs: "For the next decade, many of the wide-ranging consequences of that decision were ignored; institutional infighting was frequent, as though the most important national issue was whether the airplane drivers or the missile sitters should rule the Air Force" (213). This infighting grew from the realization, by the end of 1963, that, contrary to the established doctrine that bombers would be followed by long-range cruise missiles and then ICBMs, very few existing jet-powered strategic bombers would be replaced due to budget constraints (211). Technological complications with cruise missiles also added to planners' consternation. These technical difficulties didn't allow cruise missiles to achieve the doctrinal status envisioned; instead, cruise missiles were overtaken and replaced by ICBMs as the premier nuclear weapon delivery system. Cruise missiles thus "became quaint themes for military historians because guidance, propulsion, and reliability elements refused to conform to the expectations of those who prepared strategic doctrine" (216).

The ICBM example highlights the symbiosis between technology and doctrine—a relationship that is at the same time uncertain, as Perry points out: "the assumption that technology and doctrine will alike change in traditional, evolutionary ways is comfortable, but it is not necessarily true" (217).

This essay is immediately relevant to our national security environment. The Air Force is struggling with its role in an evolving joint doctrine. At the same time we try to justify the purchase of advanced fighter aircraft, space control systems, and information warfare technologies, the national security strategy is shifting from being able to wage war in two simultaneous major conventional conflicts to projecting power globally from the continental United States. Existing doctrine favors air superiority over almost all other forms of aerospace warfare; we therefore face difficult and emotional decisions. The relationship of technology and doctrine, as highlighted in Perry's essay, requires an unemotional evaluation of air superiority's requirements.

Air power's history, as discussed in this book, suggests a balance must be struck between leadership, technology, and doctrine. Balanced properly, these elements will lead to air power's success.